

By Rudi Hempe

Once upon a time, it is estimated that Rhode Island's woodlands were composed of 50 percent American chestnut trees. The trees were valued not only for their nuts for people and wildlife but also for their rot-resistant lumber which was used for everything from telephone poles and fencing, to house construction and furniture.

Today, only a comparative handful of mature American chestnuts are found in the state, the result of a blight that killed billions of the trees that made up half of the Eastern Forest which extended from southern Maine to Georgia. But over the last three decades a concerted effort is being made to develop a hybrid American chestnut that combines the stately form of the original American chestnut with the blight resistance of the Chinese chestnut.

That quest is being made by multiple backcrossing methods devised by The America Chestnut Foundation whose laboratories and trial orchards are based in Virginia but whose reach extends up and down the East Coast, including Rhode Island. There are four American chestnut orchards in Rhode Island—in Foster, Glocester, Westerly and South Kingstown with the latter being the newest and a model of collaboration.

In 2009, Clarkson Collins who manages the holdings of the South Kingstown Land Trust approached URI Master Gardeners wondering whether they would be interested in a 10-year collaborative effort to establish an American chestnut research orchard on land trust property.

URI Master Gardeners, increasingly interested in research ventures, leaped at the opportunity.

A team of Master Gardener volunteers which mainly works at URI's East Farm jumped to the challenge. An ideal one-acre site was found on the old Hollis Tucker Farm off Tuckertown Road just outside of Wakefield. The site, a hay field on the brow of a hill, had town water but no electricity. Dr. Brian Maynard, a URI horticulturist, donated deer fencing and posts. The URI Graduate School of Oceanography donated a 500-gallon fiberglass storage tank. The South County Garden Club, in need of a tree project to meet national directives, donated \$2,000 for an irrigation system and one of its members—a raffle winner—donated the prizes she won, a tractor mower and a string trimmer to maintain the orchard. To round it out, the land trust obtained a small grant to pick up other miscellaneous construction materials.

The Master Gardeners, whose commitment was to provide all the construction and labor and maintenance, decided to use a drip irrigation system to conserve water and improve chances of good germination. They installed a 1,000-foot water line from the entrance of the farm to the orchard site where it terminated in a float valve that automatically fills the tank. Because there was no electricity on the site, a solar-powered system (devised for Third World countries) was installed. A solar panel charges a 12-volt battery that in turn powers a pump. The orchard is divided into three irrigation zones, each with solenoid valves controlled by a timer. A rain sensor completes the setup, preventing irrigation when there is adequate rainfall.

The orchard has 11 planting rows, each three-feet wide covered with woven weed block (land trust officials did not want weed herbicides to be used on the property). The purpose of this orchard and others in the state is to trial American chestnut hybrids that are grown from nuts harvested from local trees. This method assures that the seedlings and their progeny will be acclimated to local soils and weather.

“Mother trees”—i.e. mature American chestnuts that have grown enough to produce male and female blooms and which have not yet succumbed to the blight—were located in Rhode Island. Using pollen provided by the Foundation, volunteers last year hand pollinated the female blooms by using donated cherry-picker equipment (the blooms typically are at the tops of trees). The pollinated blooms are then bagged to prevent cross pollination. The resultant nuts are harvested and then carefully stored over winter.

In 2009, only control plants—some Chinese, some American and F1 hybrids (half American and half Chinese) were planted in the orchard. A computer-generated random planting scheme is used for the entire orchard.

This year, the real trials began. Nuts harvested from a “mother tree” in Exeter and another “mother tree” in East Greenwich were planted in the South Kingstown orchard. The nuts, classified as Backcross 4 (i.e. the pollen used to generate them was harvested from trees that had been crossed four times) are planted in holes created by using bulb planters.

Into each hole a mix of peat, vermiculite, soil from the floor of a pine grove (to provide mycorrhizae) and slow release fertilizer is placed. Each nut is planted only one inch deep. A Bluex plastic tube is then placed over each nut and inserted below the soil surface to deter moles. Clothespins close the tops of the tubes to prevent turkeys from harvesting the nuts.

Once the seedlings get about 6 inches high, the Bluex tubes are removed and hardware cages are put around each seedling to prevent mole damage. Thanks to the highly efficient drip irrigation system, the South Kingstown orchard had about 95 percent germination (extra nuts were potted up at East Farm as backups to take care of any attrition).

Today the South Kingstown orchard is home to 260 seedlings all protected by an 8-foot deer fence, free of weed competition and fed by drip irrigation. Chestnut trees grow fast and in five years they should be 5-6 feet high. At that point, they will be inoculated with the blight. Those that best withstand the ravages of the blight will be used for further testing and experimentation.

It is anticipated that in a few years, the efforts of The American Chestnut Foundation, will result in nuts that will have the stately characteristics of the American chestnut and the blight resistance of the Chinese chestnut (which tends to have more of a spreading habit).

At that point, efforts will begin to seed the Eastern Forest with the hybrid nuts.

In Rhode Island, that time is years away but already in the talking stage are plans for establishing a seed orchard in South Kingstown that will provide nuts for RI forests. The chances are good that the next generations of Rhode Islanders will see the reestablishment of the American chestnut in local woodlands.

*(Rudi Hempe, a RIFCO member, is project leader for the American Chestnut Orchard Research Project in South Kingstown).*